HIV

New sexually transmitted infections among adolescent girls infected with HIV

Maria Trent, Shang-en Chung, Gretchen Clum, Jonathan M Ellen, and the Adolescent HIV/AIDS Trials Network

Sex Transm Infect 2007;**83**:468–469. doi: 10.1136/sti.2007.026161

Objectives: Although the prevalence of sexually transmitted infections (STIs) among girls infected with HIV has been reported, the incidence of STI diagnoses has not been well documented. The objectives of this study were to examine (1) incident STI diagnoses and (2) the association between viral load (VL) and incident STI diagnosis among HIV-infected adolescent girls in care.

Methods: This was a prospective longitudinal 18-month study of girls enrolled in the Adolescent HIV trials network. Cox proportional hazard modelling was performed to evaluate the incidence of STI by baseline viral load.

Results: The mean (SD) age of participants was 20.6 (2.0) years, viral load of participants was 66 917 (165 942) copies/ml and median viral load was 7096 copies/ml. The incidence of STIs for the entire cohort was 1.4 per 100 person-months. During the 18-month follow-up period, there were no significant differences in the STI incidence between the high and low viral load groups (hazard ratio (HR) = 0.86, 95% CI 0.37 to 1.95) There was also no significant association between STI incidence and log-transformed viral load (HR = 1.10, 95% CI 0.92 to 1.3).

Conclusions: Adolescent girls with HIV infection continue to acquire sexually transmitted infections after diagnosis. This analysis does not suggest that VL is a critical factor in STI acquisition over time. Additional work exploring the role of other contextual factors on STI acquisition among HIV-infected adolescent girls is warranted.

The prevalence and incidence of HIV infection continues to increase among adolescent and young adult women in the USA[1–3] and the majority of HIV-infected adolescents continue to be sexually active after diagnosis.[4] The objectives of the study were to examine (1) the diagnosis of new sexually transmitted infections (STIs) among HIV-infected adolescent girls and (2) the association between HIV-1 RNA viral load (VL) and incident STI.

METHODS

Multicentre data were collected from 143 HIV infected female patients aged 13–24 years of age participating at Adolescent HIV Trials Network (ATN) sites from July 2004 to end of March 2006. Approval was obtained from the Western Institutional Review Board (in partnership with the Johns Hopkins University School of Medicine and local institutional review boards), and informed consent was obtained from participants.

Baseline data included demographic characteristics and baseline VL data, and 3-month follow-up chart reviews assessed interval VL and STI data. Diagnostic tests and screening intervals (every 6–12 months) were consistent with standard practice in accordance with the Centers for Disease Control and Prevention STD Treatment Guidelines.[5]

The primary outcome measure was diagnosis of an STI during the 18-month study period. Infection with *Neisseria gonorrheae* (NG), *Chlamydia trachomatis* (CT), *Trichomonas vaginalis* (TV), and *Treponema pallidum* (syphilis) were grouped as a single STI variable. Outbreaks of herpes simplex viruses (HSV) and genital warts caused by human papilloma virus (HPV) were excluded from analysis as they might have resulted from existing disease.

HIV transmission among serodiscordant couples is rare when the infected partner has a VL of <1500 copies/ml and transmission increases with increasing VL.[6] Baseline VL data in this study were measured both as a log-transformed continuous measure and as a categorical measure based on the 1500 copies/ml risk-assessment categories derived from these data. Generalised estimating equations (GEE) were used to validate that that was no change in log-transformed viral load over the period of study period.

Incidence of an STI diagnosis was calculated as the rate of incident cases per person-months of exposure among enrolled participants. Time was measured in days, from the date of enrolment to the date of the first STI diagnosis during the study period. Cox proportional hazard modelling was performed to evaluate the incidence of STI by baseline VL.

RESULTS

Participants were primarily from under-represented minority groups (75% non-Hispanic black, 18% Hispanic, 7% non-Hispanic white). Mean (SD) VL was 66 917 (165 942) copies/ml, median VL was 7079 copies/ml, and 73% of participants had a VL ⩾1500 copies/ml. At baseline, mean (SD) CD4 count was 428.1 (228)/mm^3.

Over the 18-month period, 27 female patients were diagnosed with an STI (8 CT, 4 GC, 2 syphilis and 13 TV). There were 19 STI diagnoses among those with VL ⩾1500 copies/ml and 8 among those with VL <1500 copies/ml. The incidence of STI was 1.4 per 100 person-months for the entire cohort: 1.3 per 100 person-months for the high VL group and 1.6 per 100 person-months for the low VL group.

Statistical analysis

There was no significant difference in STI diagnosis between the high and low VL groups (hazard ratio (HR) = 0.86; 95% CI 0.37 to 1.95; p = 0.7) (fig 1). Sensitivity analyses using GEE did not demonstrate a significant change in log-transformed VL over time (estimate = −0.002; 95% CI −0.005 to 0.0012, p = 0.2), therefore VL at study entry was used in a proportional hazard model examining the relationship between STI diagnosis and

Abbreviations: ATN, Adolescent HIV Trials Network; CT, *Chlamydia trachomatis*, GEE, generalised estimating equations; HPV, human papilloma virus; HSV, herpes simplex viruses; NG, *Neisseria gonorrhea*; STI, sexually transmitted infection; VL, viral load

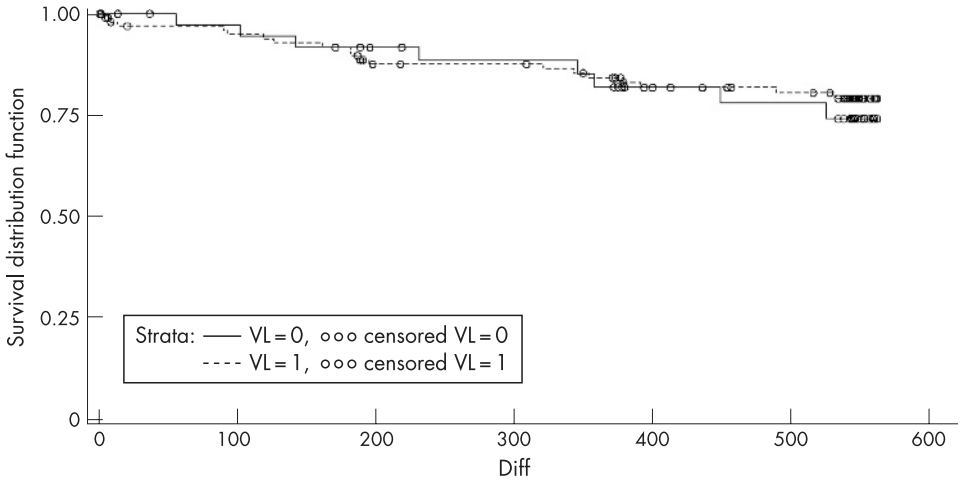

Figure 1 Survival curve depicting time to sexually transmitted infection, excluding herpes simplex and human papilloma virus infections. Solid line, data from adolescents with viral load ⩽1500 copies/ml; dashed line, viral load >1500 copies/ml at baseline.

log-transformed VL. There was also no significant association between STI diagnosis and log-transformed VL (HR = 1.10; 95% CI 0.92 to 1.30; p = 0.3). The estimated probability of an STI occurring for the high and low VL groups was 0.05 and 0.06 by 3 months, 0.11 and 0.08 by 6 months, 0.12 and 0.12 by 9 months, 0.17 and 0.18 by 12 months, 0.18 and 0.22 by 15 months and 0.21 and 0.26 by 18 months, respectively. After the initial diagnosis, 8 of the 27 participants were diagnosed with ⩾1 additional STIs.

DISCUSSION

This work demonstrates that many HIV-positive adolescent girls in care will be diagnosed with at least one STI during an 18-month period and that they acquire STIs independent of the likelihood of HIV transmission based on their VL status. Although acquisition of STIs among HIV-infected girls suggests ongoing sexual behaviour and raises concerns about public health, the estimates of STI incidence and probability over time is lower than previously published estimates from high-risk non-infected adolescents and young adults.[7–9]

Limitations

The results of this work must be interpreted in the context of several limitations. This study relied on data from medical records and could not take into account unreported STIs diagnosed outside primary care. This method for estimating incidence probably underestimates STI-related disease. However, these numbers represent the actual burden of disease observed in HIV clinical care sites and are noteworthy.

CONCLUSION

Adolescent girls with HIV infection continue to acquire STIs after diagnosis, but VL does not appear to be a critical factor in STI acquisition over time. Additional work exploring the role of other contextual factors on STI acquisition among HIV infected adolescent girls is warranted.

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Competing interests: None declared

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Accepted 6 August 2007

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